

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the above-referenced application.

1. (Currently amended) An isolated [[A]] nucleic acid comprising a modified gene encoding a non-mammalian anti-staphylococcal protein, the gene including a sequence that codes for an amino acid sequence that is identical to the anti-microbial a lysostaphin protein, wherein the lysostaphin protein differs from a naturally occurring version of lysostaphin produced by the natural a host that naturally produces lysostaphin, wherein except that the coding encoded protein sequence includes one or more alterations with respect to the naturally occurring version of lysostaphin, and wherein one or more of the alterations disrupts that disrupt one or more mammalian post-translational processing glycosylation events, so that the non-mammalian protein is produced and secreted by mammalian cells in its active form and is recognized by a polyclonal antibody that recognizes the naturally occurring version of lysostaphin.
2. (Currently amended) The nucleic acid gene of claim 1, wherein the modified gene comprises is operatively linked to at least one mammalian regulatory sequence operatively linked to the sequence that codes for the lysostaphin protein.
3. (Currently amended) The nucleic acid gene of claim 1 wherein the one or more alterations alteration eliminates one or more glycosylation sites.

4 – 26. (Cancelled).

27. (New) The nucleic acid of claim 1, wherein the gene comprises a eukaryotic promoter operatively linked to the sequence that codes for the lysostaphin protein.
28. (New) The nucleic acid of claim 27, wherein the eukaryotic promoter is a tissue-specific promoter.
29. (New) The nucleic acid of claim 27, wherein the eukaryotic promoter directs expression of the gene in cells of the mammary gland.

30. (New) The nucleic acid of claim 1, wherein the gene encodes a eukaryotic secretion signal.
31. (New) The nucleic acid of claim 1, wherein the gene encodes a eukaryotic start codon, the Kozak expression start site consensus sequence, or both.
32. (New) The nucleic acid of claim 1, wherein the gene encodes a preprolysostaphin protein.
33. (New) The nucleic acid of claim 1, wherein the gene encodes a prolysostaphin protein.
34. (New) The nucleic acid of claim 1, wherein the sequence is optimized to reflect eukaryotic codon usage.
35. (New) An isolated nucleic acid comprising a gene that encodes a lysostaphin protein, wherein the lysostaphin protein is recognized by a polyclonal antibody that recognizes a naturally occurring version of lysostaphin, and wherein the sequence of the lysostaphin protein contains at most one intact Asn-X-(Ser/Thr) sequence, so that the non-mammalian protein is produced and secreted by mammalian cells in its active form.
36. (New) The nucleic acid of claim 35, wherein the gene comprises at least one mammalian regulatory sequence operatively linked to the sequence that codes for the lysostaphin protein.
37. (New) The nucleic acid of claim 35, wherein the gene comprises a eukaryotic promoter operatively linked to the sequence that codes for the lysostaphin protein.
38. (New) The nucleic acid of claim 37, wherein the eukaryotic promoter is a tissue-specific promoter.
39. (New) The nucleic acid of claim 37, wherein the eukaryotic promoter directs expression of the gene in cells of the mammary gland.
40. (New) The nucleic acid of claim 35, wherein the gene encodes a eukaryotic secretion signal.

41. (New) The nucleic acid of claim 35, wherein the gene encodes a eukaryotic start codon, the Kozak expression start site consensus sequence, or both.
42. (New) The nucleic acid of claim 35, wherein the gene encodes a preprolysostaphin protein.
43. (New) The nucleic acid of claim 35, wherein the gene encodes a lysostaphin protein.
44. (New) The nucleic acid of claim 35, wherein the sequence is optimized to reflect eukaryotic codon usage.